DOCUMENT RESUME

ED 344 639 JC 920 209

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TITLE Assessing the Bean and Metzner Model with Community College Student Data.
PUB DATE 21 Apr 92
NOTE 49p.; Paper presented at the Annual Meeting of the American Educational Research Association (73rd, San Francisco, CA, April 20-24, 1992).
PUB TYPE Reports - Evaluative/Feasibility (142) -- Statistical Data (110) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Persistence; Community Colleges; *Models; Predictive Validity; *Predictor Variables; *Research Methodology; Research Problems; *School Holding Power; *Student Attrition; Two Year Colleges; Two Year College Students

ABSTRACT

The Bean and Metzner Nontraditional Undergraduate Student Attrition Model appeared to be a good model to address community college student attrition because it takes into account the environmental variables that colleges must consider to enhance persistence. A study was conducted to determine how well the Bean and Metzner Model fit with community college student data and to make theoretically consistent modifications to the model if the fit were weak. Survey data collected from 597 respondents enrolled at an urban community college were analyzed. Variables included age, gender, ethnicity/race, enrollment status, educational goals, high school rank, academic variables (e.g., study habits and absenteeism), environmental variables (e.g., finances, employment, and family responsibilities), grade point average, psychological outcomes (e.g., satisfaction and stress), intent to leave (e.g., plan to re-enroll and transfer difficulty), and dropout. The method used to assess the Bean and Metzner model with these data was structural equation modeling, and statistical procedures were carried out using LISREL and LISCOMP. When the model was found to be a weak fit with community college data, exploratory factor analysis was employed and resulted in identifying a new model, the Community College Retention Model, which was tested with the community college data and further tested on two student subgroups. The Community College Retention Model proved to be a plausible model. (Author/AC)

ASSESSING THE BEAN AND METZNER MODEL WITH COMMUNITY COLLEGE STUDENT DATA

by

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Presentation at the
AERA annual meeting
April 21, 1992
San Francisco

ABSTRACT

Reviewed in the context of the community college literature, the Bean and Metzner Nontraditional Undergraduate Student Attrition Model (1987) appeared to be a good model to address community college student attrition, particularly because it takes into account the environmental variables that community colleges must consider to enhance persistence. However, due to the lack of studies validating Bean and Metzner's model with community college student data, the appropriateness of the model for explaining community college student attrition has not been clearly determined. The purpose of this study was to determine how well the Bean and Metzner Model fit with community college student data and to make theoretically consistent modifications to the model if a weak fit were to be found.

This study analyzed survey data collected from 597 respondents who were enrolled in an urban community college at the time of the study. The survey items and variables were comparable to those used in other published studies. The method selected to assess Bean and Metzner's model with community college student data was structural equation modeling. The required statistical procedures were carried out with two computer programs, LISREL (Jöreskog & Sörbom, 1989) and LISCOMP (Muthén, 1988). Both programs are increasingly recognized as formal mathematical models; LISREL is more widely used than LISCOMP, but LISCOMP may be better suited for student persistence research when using categorical data (Muthén, 1984).

When the Bean and Metzner model proved to have weak fit with the community college student data, exploratory factor analysis was employed and resulted in identifying a new model, the Community College Retention Model, that proved to be a better fit for the data when assessed by structural equation modeling. The Community College Retention Model was further tested on two student subgroups determined by gender and again proved to be a plausible model.

Assessing the Bean & Metzner Model With Community College Data

Introduction

Once opportunities of access have been enhanced, the retention of students is recognized as critical by all institutions of higher education. It is especially critical to community colleges because the open door philosophy encourages students with varying degrees of academic preparation to participate in postsecondary education. Many critics argue this open door has resulted in a revolving door with many students entering and few persisting (Richardson & Bender, 1987). The revolving door is costly in terms of monetary and human resources. The student who drops out experiences psychological loss, disappointment, and decreased earning power. The institution experiences an erosion of capacity and loss of credibility (Cope & Hannah, 1975).

The issue of attrition remains even more critical when it is recognized that community colleges are the most likely point of entry for ethnic minorities and women (Lea, Sedlacek, & Stewart, 1979; McCool, 1984). Overall, students are less prone to complete a degree if they begin in a community college (Anderson, 1981; Kohen, Nestel, & Karmas, 1978). This is troublesome because of the demographic changes that will occur over the next 10 years. A much higher percentage of the youth cohort will be from minority backgrounds, from single-parent families, from poverty households, from multiple earner families, and from "blended" families resulting from remarriage of one original parent (Hodgkinson, 1983, 1984, 1990).

The growth market in higher education also will undergo significant changes during the next two decades. Workers, heads of households, women, and/or ethnic minorities will become the modal students. These dramatic demographic alterations will result in community colleges attracting and enrolling more students with the very attributes associated with academic underpreparation and nonpersistence (Astin, 1975, 1985; College Board, 1985; Hodgkinson, 1983, 1984; Stahl, 1986). The central role of the community college is very clear: Realizing the potential dreams of a vast number of our citizens who seek a higher education.

Statement of the Problem

Few studies have advanced a comprehensive model of community college student attrition or persistence. The Bean and Metzner (1987) Nontraditional Undergraduate Student Attrition Model represents one attempt at identifying constructs and variables in a dynamic path diagram that define

relationships and outcomes. Tinto (1975, 1987) represents another framework but is seemingly ill suited to assessing community college outcomes because of the emphasize on social integration and lack of definement when describing the effects of external commitment.

The paucity of research literature advancing a comprehensive community college outcome model or assessing the Bean and Metzner model with community college data offers incentive enough to conduct the study. Therefore, a two part research question guided the study:

1. To what extent does the Bean and Metzner model, as operationalized in the present study, account for the attrition of community college students? If the model does not "fit" the data, how can the model be modified to better account for persistence?

This question will be addressed using survey data and an analysis procedure referred to as structural equation modeling. Details of the Bean and Metzner model, sample, variables used in the study, and statistical procedures are presented in the following sections.

Conceptual Framework

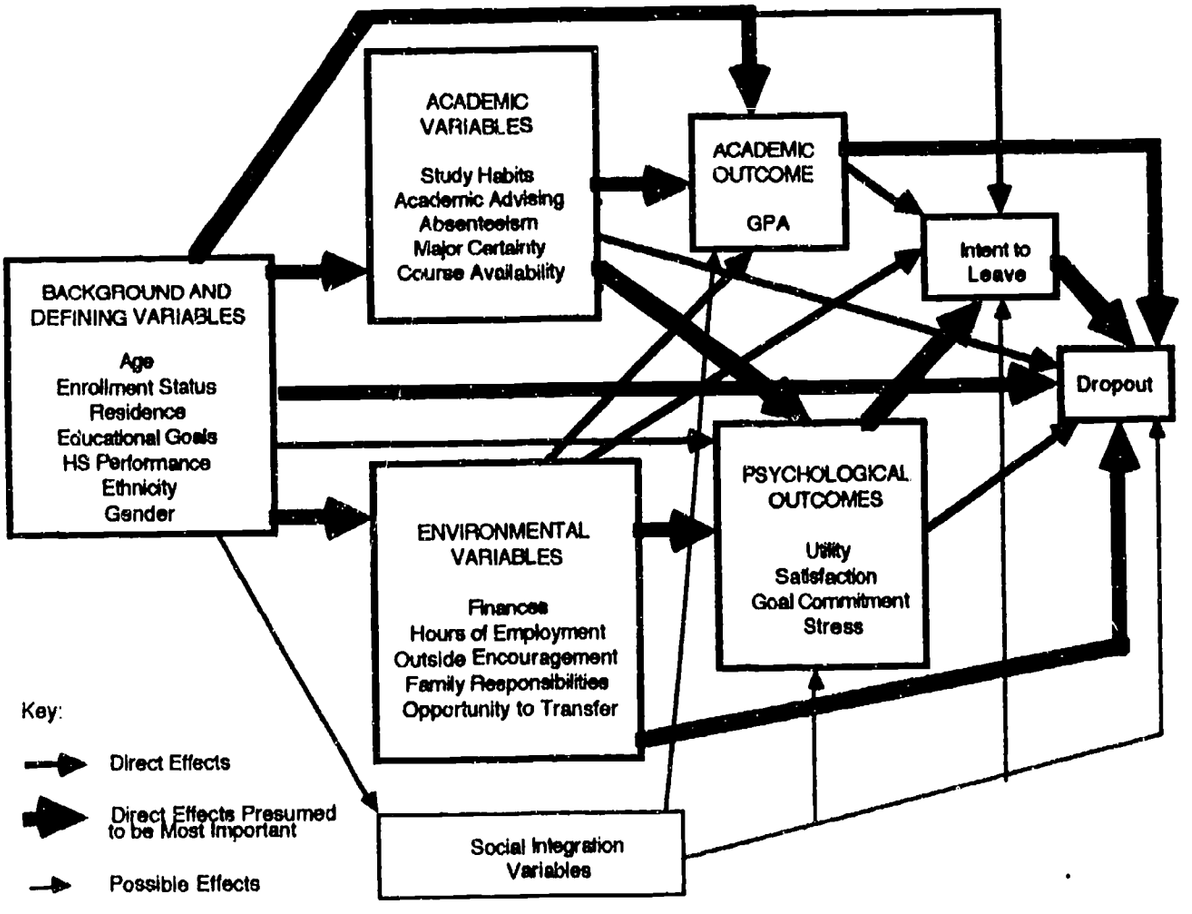
Acknowledging the contributions of the Tinto model in showing the relationship among student and environmental variables yet recognizing the model's limitations when applied to predicting the withdrawal decision of students in community colleges, Bean and Metzner (1985) developed a conceptual model to explain attrition and retention of nontraditional students. The Bean and Metzner model was selected to guide this study because it takes into account the contributions of the person-environment fit theory as well as Tinto's conceptual schema and recognizes the unique relationship of nontraditional students within the context of the community college. The term nontraditional student encompasses all students other than the traditional 18- to 24-year old single male student who attends a residential college full time.

Because nontraditional students are often older, commuters, and usually employed at least part time, the college environment has less impact on them. The influence of social integration is less than predicted by Spady (1970), Tinto (1975, 1987), and Pascarella (1980). The environmental press is different for nontraditional students. They participate in fewer extracurricular activities, use fewer college services, have classroom experiences similar to those of traditional students, and have greater interaction with the environment external to the college.

The Bean and Metzner model (Figure 1) indicates four sets of variables as the basis of the withdrawal decision. First, students with poor academic performance, highly related to high

school GPA, tend to dropout at a higher rate. A second influence is intent to leave which is affected by academic variables and psychological factors. Background and defining variables, especially high school performance and educational goals, exert a third influence. Fourth, environmental variables exert direct effect on the withdrawal decision.

Figure 1. Bean and Metzner's conceptual model of nontraditional student attrition



From "The Estimation of a Conceptual Model of Nontraditional Undergraduate Student Attrition" by J. P. Bean and B. S. Metzner, 1987, Research in Higher Education, 27 (1), p. 17.

The model indicates that environmental factors exert more influence than academic variables and can compensate for negative effects of the academic variables. That is, a student with adequate financial and/or emotional support may persist despite poor advisement or uncertainty of major. However, the reverse is not true. Positive academic variables cannot overcome negative effects of the environmental variables; family responsibilities and job come first (Attinasi, Stahl, & Okun, 1982; Bean & Metzner, 1987).

A second compensatory effect is between academic outcome (GPA) and psychological outcomes. Positive psychological outcomes may compensate for lower GPA if students perceive high levels of utility, satisfaction, or goal commitment. However, the effects of high GPA cannot overcome the negative effects of high levels of stress or low levels of utility, satisfaction, or goal commitment.

Background variables are included in the model because of effect on future performance. For example, high school performance is the best indicator of college GPA. Defining variables must be controlled for interaction with the other variables. The external environment reduces the likelihood students will interact with peers and faculty and may exert negative effects on persistence. Academic variables have direct effect on GPA as well as increasing interaction with the institution, both of which increase commitment to persist. Both academic and environmental variables affect psychological outcomes. GPA affects decision to persist or withdraw voluntarily.

Unlike the importance attributed to social integration in the Tinto model, social integration in the Bean and Metzner nontraditional student model is assigned little importance but is included to recognize the possible influence exerted in individual cases.

Background variables. Age is included as a significant variable because nontraditional students are older, and older students have been found to withdraw at a higher rate (Astin, 1975). The model assumes older students have more family responsibilities and are employed which affect absenteeism, an academic variable. The number of credits attempted, enrollment status, is included because it is assumed that students enroll part time due to hours of employment and/or family responsibilities.

Residence is the most critical variable in the model for distinguishing nontraditional from traditional students. Commuters spend little time on campus outside class, have fewer friends at college, have less faculty contact, and participate in fewer extracurricular activities. Commuters usually express more concerns over financing their education. Because they are more likely to be employed and have family responsibilities, commuters talk about demands on their time (Attinasi et al., 1982). However, commuters do not differ substantially from residential students in amount of time spent preparing for class or in classroom experiences.

Educational goals (certainty of major, intent to transfer, goal commitment, and intent to leave) are included in the model as background variables because they have direct or indirect effect on

persistence. Since many community college students are not seeking degrees, that subset should be identified and should not be grouped with students seeking degrees. Another background variable is high school academic performance. High school GPA and rank are positively related to persistence (Astin, 1975; Cope & Hannah, 1975; DeVecchio, 1972; Peng & Fetters, 1978) and may be the best predictor of persistence (Bean & Metzner, 1985). However, commuting students frequently possess lower grade point averages and achievement test scores (Chickering, 1974); furthermore, extremely limited research has been conducted to assess the importance of high school GPA on persistence for older, nontraditional students.

Although there are contradictory findings about the effect of ethnicity/race on persistence, Bean and Metzner included ethnicity as a background variable with indirect negative effect on GPA because they assumed a comparatively poorer high school education for minority students. Gender affects attrition indirectly. Bean and Metzner stated that stereotypical roles still exist in the external environment and affect persistence through family responsibilities (negative effects on persistence for women) and lack of opportunity to transfer (positive effect on persistence for women).

Academic variables. The academic variables (study skills and habits, academic advising, absenteeism, certainty of major, and course availability) have indirect effects on persistence through GPA, through psychological outcomes, and through intent to leave. Older students report they spend more time studying than traditional age students, but no research has yet related study time to attrition.

Academic advising, as a variable, measures student usage and evaluation of the service. Although the results of studies have been contradictory about the direct effect of advisement, a recent study by Metzner found the indirect effects of high quality advisement are negatively related to attrition, and low quality advisement affected persistence more than no advisement (Metzner, 1989). In informal studies, commuter dropout students have expressed dissatisfaction with academic advisement or indicated improved advisement services might have kept them in college.

Absenteeism has a negative effect on persistence for students with low academic ability and confidence but has no significance for students who perform better academically. It is included in the model because nontraditional students typically fall in the former category. Certainty of major has a significant positive effect on persistence regardless of the age or residence of the student. Course unavailability is a strong predictor of dropout or transfer, especially for part time students.

Environmental variables. Environmental variables measure factors over which the institution has little control yet may potentially pull the student away from the college. Lack of finances, long hours of employment, lack of encouragement, family responsibilities, and opportunities to transfer have both direct effect on attrition as well as an indirect effect through the psychological outcome variables. Financial difficulty leads to withdrawal regardless of age or enrollment status. Furthermore, ability to pay has more effect on goal and institutional commitments than does academic integration (Cabrera, Castaneda, Nora, & Hengstler, 1990).

Although results are often contradictory, it appears that employment for more than 20 hours a week is negatively associated with persistence. Encouragement by parents is positively associated with persistence for traditional students but the effect of spousal encouragement has been found to be less clear. The influence of friends on the decision to persist or dropout is strong for both traditional and nontraditional students. Although no empirical evidence about the effect of employer attitude was found, Bean and Metzner assume a supportive employer who adjusts work schedules and remits tuition and fees will have a positive effect on persistence. In their model, Bean and Metzner replaced Spady's and Tinto's normative (insider) support with outside encouragement because of the importance of peers, friends, family, and employees. In studies examining the effect of family responsibilities on persistence, the number of children in families of community college nontraditional students was found to be positively associated with attrition.

Social integration. Social integration was omitted as a primary component of the model because, unlike traditional students, nontraditional students do not make persistence decisions based on the social life or fit of the college. Grade point average directly affects the persistence decision. Although findings have been mixed, first semester grade point average is a highly significant predictor of persistence for older students (Costa, 1984; Knoell, 1976).

Psychological outcomes and intent to leave. Academic and environmental variables directly influence psychological outcomes (utility, satisfaction, goal commitment, and stress) which, in turn, influence intent to leave. Commuter students are especially interested in the utilitarian aspects of their education and will persist if they perceive a practical value to education (Chickering, 1974). However, many older students also want personal rather than career development (Wolfgang and Dowling, 1981).

Satisfaction measures the degree of enjoyment of the student role and of stimulation resulting from courses. Although goal commitment has been found to be a strong predictor of persistence in residential universities, its effect in community colleges is lessened because so many students enroll to enhance vocational and personal development. Stress has a negative influence on persistence. Commuter students experience stress from the external environment as well as from college requirements and often talk of the many demands on their time by family, employment, and cours work.

Intent to leave is the strongest predictor of persistence (Bean, 1980, 1982, 1985; Pascarella et al., 1986). Placement in the Bean and Metzner model shows that psychological outcomes are the best predictors of intent, and intent is the best predictor of dropout. Intent to leave is closely associated with Tinto's postmatriculation institutional commitment; however, intent to leave more accurately reflects the shorter time frame used for most attrition studies.

Bean and Metzner attributed direct influence by academic variables on GPA and intent to leave, the two strongest predictors of persistence. One of those academic variables, academic advising, is a critical independent variable in this study. It is during academic advisement that students learn of the results of their assessment testing and are advised about courses to take. If there is a successful match between courses taken and the student's ability to succeed, the GPA will be sufficient to allow the student the choice of returning to the institution. Academic variables exert a direct influence on dropout as well as indirect effect through intent to leave and psychological outcomes. GPA directly affects dropout as well as indirectly through intent to leave.

Research Design

This section reports the research design providing a description of the sample, data collection procedures, and definition and measurement of the variablesl. This section also contains a brief discussion of two analytical methods used during the analysis: exploratory factor analysis and structural equation modeling. The computer program LISREL (LInear Structural RELationships) was used to assess the measurement and structural models needed to determine the model's fit to the data. These results were later verified by another computer program LISCOMP (LInear Structural equations with a COMPrehensive measurement model). Of the two, LISREL is more refined, is easier to understand, and provides better statistical output; however, LISCOMP is preferred when employing categorical, non-normal data (Ethington, 1987; Muthén, 1983, 1984,

1988; Stage, 1989). This study used both to take advantage of the strengths and overcome the weaknesses of each. Exploratory factor analysis was employed to suggest revisions to the model to improve its "goodness-of-fit" for community college students.

Sample and Data Collection

Students from a single, comprehensive community college in an urban, multi-college district composed the sample for this study. The college enrolls close to 10,000 students. The subjects included were enrolled in beginning courses of reading, English, and mathematics. Only students present in class on the day when the survey was administered were included in the sample.

The data were collected in several stages. First, class sections in beginning reading, mathematics, and English courses were randomly selected for inclusion in the survey analysis (Spector, 1981). If a faculty member requested that his/her class section not be included, a randomly selected replacement section was substituted. Second, a survey was pilot tested during the 12th week of the semester, and questions were revised to be understood more easily by the students and, thereby, to obtain more accurate information (Babbie, 1973). The revised survey was administered during the 14th week of the semester. A third step was to obtain information about grade point averages and subsequent re-enrollment through the college student information system after the Fall 1990 semester began.

Table 1 reports the numbers of students in each course who returned surveys and who remained in the sample. Although the courses selected for this study are considered beginning courses, two students in Reading 101 and three students in Mathematics 129 were enrolled in the semester just prior to their graduation and were excluded from this study.

Table 1
Survey Response Information

Courses	Students Enrolled	Surveys Returned	% Returned	Incomplete Surveys	Completed Surveys	% Students
Reading 081	16	11	69	2	9	56
Reading 091	86	55	64	7	48	56
Reading 101	212	130	62	29	99	47
English 071	108	67	62	10	57	53
English 101	411	234	57	24	210	51
Mathematics 077	327	75	23	17	58	18
Mathematics 124	40	19	48	1	18	45
Mathematics 129	319	194	61	25	166	52
Totals	1519	785	52	115	665	44

Variables and Data Analysis

Assessing the efficacy of the Bean and Metzner model required a method of causal analysis, with the purpose not to prove causation but to determine if the causal inferences projected a priori by a theoretical model were consistent with the empirical data (Bollen, 1989; Pedhazur, 1982). Causal analysis is an efficient method for determining the indirect and direct influences of each independent variable in a theoretically guided causal framework and provides more information to the researcher than regression analysis (Pascarella & Terenzini, 1991).

Structural equation modeling was selected as the method of analysis because it, unlike path analysis, can accommodate categorical variables (i.e., nominal or ordinal scale) error in measurements, and residuals that may be correlated (Baldwin, 1989). Structural equation modeling is a quantitative technique that estimates the covariances among the observed variables and then uses the covariances to assess the hypothesized relationships among the latent constructs proposed by a theoretical model. Basic concerns before beginning any research involving structural equation modeling to test the fit of a theoretical framework include substantive theory that is grounded in sound research (Baldwin, 1989; Pascarella & Terenzini, 1991) and a sample size that is larger than the number of structural coefficients (hypothesized relationships) to be estimated (Long, 1983a).

The first concern was addressed by the Bean and Metzner model which is an adaptation of Tinto's theoretical model for use with nontraditional students. This framework addresses another concern that relationships among the variables must be linear, additive, and causal (Stage, 1989). The second consideration was also satisfied; the sample size far exceeded the number of structural coefficients and indicated sufficient size to retain robustness (Boosma, 1983; Ethington, 1987).

A third assumption is multivariate normal distribution of the measured variables. Violation of this assumption results in undependable *t*-values and very difficult model respecification (Baldwin, 1989). This concern was met by the selection and measurement of the observed variables retained for the LISREL analysis and by verification of the results with LISCOMP.

This study, as is the usual case, employed a structural equation model and two measurement models in assessing the Bean and Metzner framework. The structural equation model is represented by the linear structural equation

$$\eta = B\eta + \Gamma\xi + \zeta.$$

In this equation, η (eta) is the vector of the endogenous variables; ξ (ksi) is the vector of the exogenous latent variables; ζ (zeta) is a vector of the residuals or errors. The constructs of the model (η and ξ) are designated as latent variables while the measure of the constructs is performed by the observed variables (X and Y). It is important that each latent construct be estimated by at least two, but preferably three or more, indicators to overcome the problems of measurement error and unreliability (Baldwin, 1989; Gallini & Mandeville, 1984; Marsh, 1988, 1990).

Latent variables are labeled exogenous when they are determined outside the model and, thus, are not explained by the model (Long, 1983b). An exogenous variable acts only as a cause. In the Bean and Metzner model, "Background and Defining Variables" are considered exogenous variables. Endogenous variables, on the other hand, are latent constructs explained by the model. They act as either a cause and/or as an effect. Examples of endogenous variables from the Bean and Metzner framework include Academic Variables, Environmental Variables, Intent to Leave, and Psychological Outcome variables.

In the linear structural equation, B (Beta) and Γ (Gamma) are designations for the structural coefficient matrices. The B matrix represents the direct effects of the η-variables on each other, e.g., the effect of the external environment on psychological outcomes in the Bean and Metzner model. The components of the Γ matrix represent the direct effects of x-variables on the η-variables. An example from the model is the effect of the Background and Defining Variables section (x_1) on all the other factors (η's).

The values and changes in the latent constructs are determined by the observed variables, labeled as X and Y. The equations for the observed variables are

$$X = \Lambda_{\xi} \xi + \delta$$

and

$$Y = \Lambda_{\psi} \eta + \varepsilon.$$

Lambda X (Λ_x) is the matrix of factor loadings of the X independent, observed variables upon the ξ exogenous latent variables. Lambda Y (Λ_y) represents the matrix of factor loadings of the Y dependent, observed variables upon the h endogenous latent variables. Delta (δ) and epsilon (ε) are error terms.

Path diagrams and matrices illustrate the theorized relationships among the exogenous, endogenous, and error variables within the framework. The following conventions govern the

drawing of path diagrams in structural equation modeling (Joreskog & Sorbom, 1988):

1. Observed variables are enclosed in squares or rectangles. Latent variables are enclosed in circles or ellipses. Error terms are indicated but not enclosed.

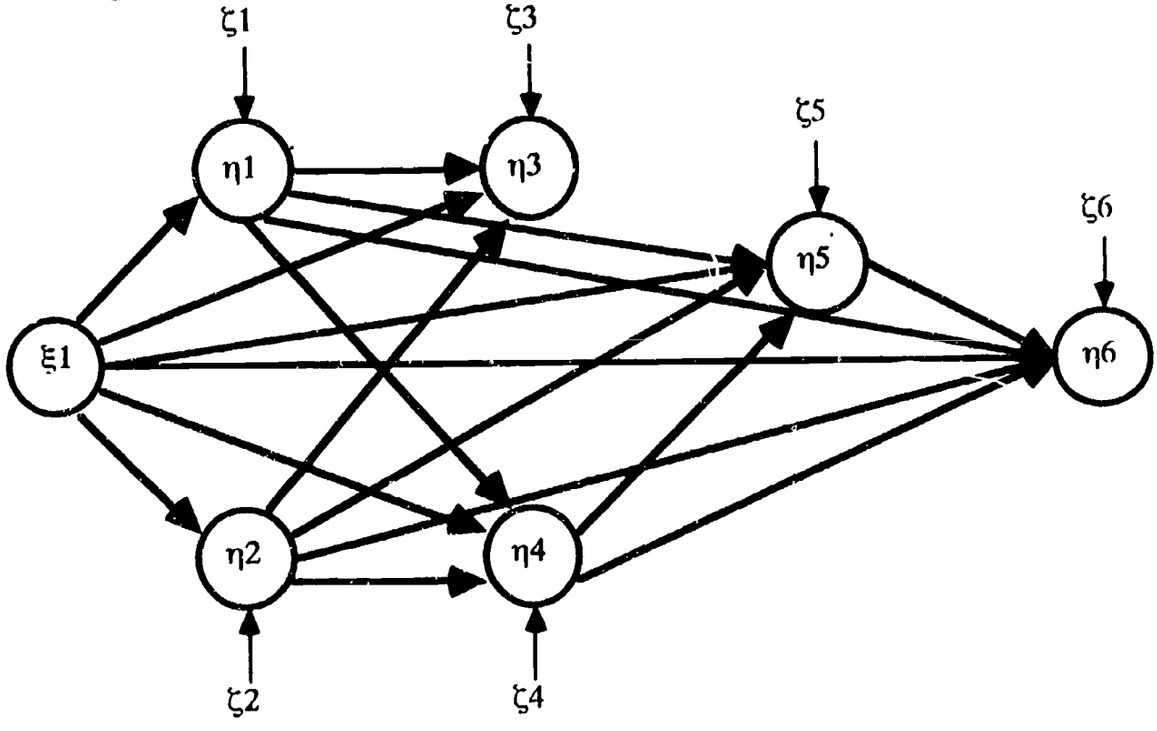
2. Arrows point from latent constructs to the observed variables used to measure the constructs.

3. Unidirectional arrows from one variable to another indicate direct influence of the first variable on the second.

4. Each arrow is represented by two subscripts. The first indicates the variable at which the arrow is pointing; the second subscript indicates the variable that is directly influencing the second variable. When applying these concepts to developing matrices, the first subscript corresponds to the matrix row, and the second subscript represents the matrix column.

The path diagram of Bean and Metzner's model is displayed in Figure 2. The Background and Defining Variables compose the only exogenous constructs (ξ). However, there are six endogenous constructs: academic variables (η_1), environmental variables (η_2), academic outcome (η_3), psychological outcomes (η_4), intent to leave (η_5), and dropout (η_6).

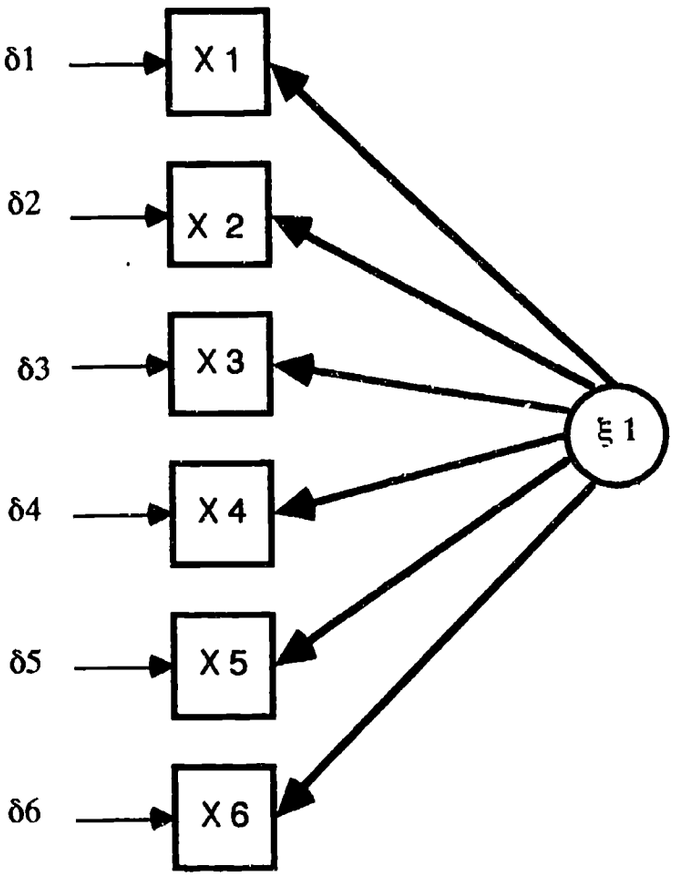
Figure 2. Structural equation path diagram of the Bean and Metzner model



Note: Path subscripts are omitted to reduce clutter.

The next step in establishing the total path diagram was development of the two measurement equation models that display the number of observed variables that load upon the latent constructs of the framework. Figure 3 shows the six observed X-variables that load on ξ_1.

Figure 3. Path diagram of measurement equation of X-variables on ξ



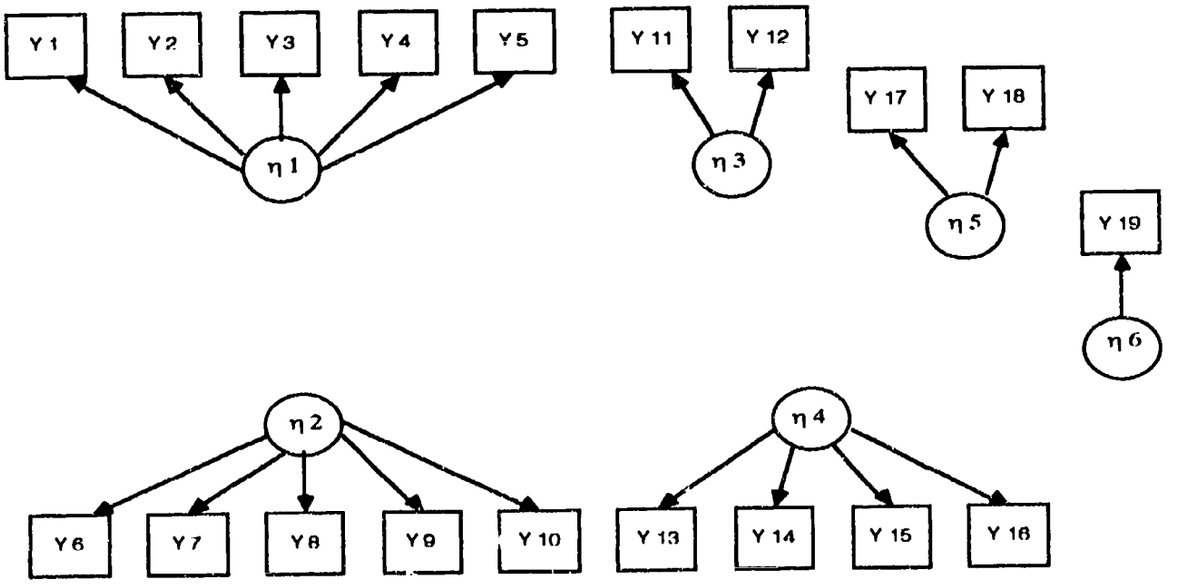
Note: Path subscripts are omitted to reduce clutter.

Table 2
Description of Observed Variables Used to Measure ξ

Variable		Survey Question
X_1	Age	43. What is your age? (1= 19 or younger; 5 = 35+)
X_2	Gender	44. What is your gender? (1= Female; 2 = Male)
X_3	Ethnicity/Race	45. With which ethnic group do you identity? (1 = White; 2 = Black; 3 = Hispanic; 4 =Indian (Native American); 5 = Other)
X_4	Enrollment Status	38. How many credits are you currently carrying at this ge? (1 = 0; 6 = 12+)
X_5	Educational Goals	31. at is the highest level of education you seek? (1= sses only; 5 = graduate or professional study)
X_6	High School Rank	hat was your overall high school ranking? (1=top; 4 = below 75%)

Figure 4 illustrates how the 19 observed Y-variables load on the six ηs hypothesized in the Bean and Metzner model. Again, the arrows indicate the relationship between the observed variables and the corresponding latent constructs. These relationships correspond to the structural coefficients to be estimated in Λ_x and Λ_y.

Figure 4. Path diagram of measurement equation of Y-variables on η



Note Path subscripts and error terms are omitted to reduce clutter

Table 3
Description of Observed Variables Used to Measure η Variables

Variable		Survey Queston
Academic Variables (η_1)		
Y_1	Study Habits	17. Hours spent on homework weekly (1 = 0-5; 2 = 6-10; 3 = 11-15; 4 = 16-20; 5 = 21 or more)
		18. Confident that possess good study skills (1 = very confident; 5 = not at all confident)
		19. Complete homework on time (1 = always; 5 = never)
Y_2	Academic Advising	15. Satisfaction with academic advisement (1 = strongly agree; 5 = strongly disagree)
		16. Instructors will give extra help if requested (1 = strongly agree; 5 = strongly disagree)
Y_3	Absenteeism	23. Absent from class (1 = much more than other students; 5 = never miss class)
		24. Considered withdrawing due to absences (1 = strongly agree; 5 = strong disagree)
Y_4	Certainty of Major	20. Certain of major (1 = very certain; 5 = very uncertain)
Y_5	Course Availability	21. Availability of desired courses (1= all wanted; 5= none)
		22. Availability of courses at convenient times (1= all; 5 = none)
Environmental Variables (η_2)		
Y_6	Finances	13. Able to obtain necessary finances for next semester (1 = strongly agree; 5 = strongly disagree)
Y_7	Employment	1. How many hours work at job (1 = 1-10; 2 = 11-20; 3 = 21-30; 4 = 31-40; 5 = 41+)
Y_8	Encouragement	8. Family supports college attendance (1 = strongly agree; 5 = strongly disagree)
		10. Friends support college attendance (1 = strongly agree; 5 = strongly disagree)
		12. Employer supports college attendance (1 = strongly agree; 5 = strongly disagree)
Y_9	Family Responsibilities	28. Family responsibilities interfere with college (1 = not all all; 5 = a very great amount)
Y_{10}	Opportunity to Transfer	26. Likelihood to transfer (1 = very unlikely; 5 =very likely)
		37. Useful to attend another college next semester (1 = very useful; 5 = very useless)
Academic Outcome (η_3)		
Y_{11}	Cumulative GPA	Student records
Y_{12}	Semester GPA	Student records

Psychological Outcomes (η_4)		
Y_{13}	Utility	35. Beneficial for career to re-enroll (1 = not at all; 5 = a very great amount)
		36. Desirable to re-enroll (1 = very desirable; 5 = very undesirable)
Y_{14}	Satisfaction	27. Loyalty to college (1 = strongly agree; 5 = strongly disagree)
		30. Overall satisfaction with life (1 = very satisfied; 5 = very dissatisfied)
		34. Satisfaction with quality of education (1 = very satisfied; 5 = very dissatisfied)
Y_{15}	Goal Commitment	32. Importance of achieving educational goal (1 = very important; 5 = not at all)
		33. Likelihood of achieving educational goal (1 = very likely; 5 = very unlikely)
Y_{16}	Stress	2. Interference of job with college commitments (1 = a very great amount; 5 = not at all)
		29. Pleasant to be a student (1 = not at all; 5 = a very great amount)
Intent to Leave (η_5)		
Y_{17}	Plan to Re-enroll	25. Likely to re-enroll next semester (1 = very unlikely; 5 = very likely)
Y_{18}	Transfer Difficulty	14. Difficulty to transfer next semester (1 = very difficulty; 5 = very easy)
Dropout (η_6)		
Y_{19}	Dropout	Student records

Measures of Fit

The overall "fit" of the model was assessed by examining the ratio of the chi square statistic (χ^2) with the corresponding degrees of freedom (df). If the ratio of χ^2 with the degrees of freedom is high, the fit is considered poor. However, the fit is considered acceptable when the ratio is between ≤ 2 (Byrne, 1989) and ≤ 3 (Carmines & McIver, 1981). Some researchers even find a ratio of ≤ 5 reasonable (Wheaton et al., 1977). The χ^2 statistic is very much affected by sample size. If the sample size is too small, the likelihood of accepting an incorrectly specified model is increased. If the sample size is too large, there is greater likelihood of rejecting a correctly specified model (Baldwin, 1989; Gallini & Mandeville, 1984).

The probability level (p) reported is the likelihood of obtaining a higher χ^2 than the one achieved, given a correct model (Joreskog & Sorbom, 1988). Because of this crucial difference, the significance of path coefficients is estimated by *t*-values. *T*-values greater than $\pm$ 1.96 indicate that a coefficient is statistically different from zero (SPSS, 1990).

Another output statistic, root mean square residual (RMSR), also provides valuable information about the goodness-of-fit. The RMSR is the average of variances and covariances and assesses changes in the model when using the same data. The RMSR scale ranges from 0 to 1, but values $\leq$ .05 are preferred. Root mean square residual averages the differences between the hypothesized covariance matrices and the actual structural covariance estimates. It is particularly helpful in assessing the strengths and weaknesses of various model components in addition to the overall goodness-of-fit.

In addition to assessing the overall goodness-of-fit, the fit of the individual components of the model can be assessed through examination of the measurement and path coefficients with the corresponding *t*-values. The component measures of fit are critical for improving the model by identifying the significance of the contributions of observed variables to latent constructs and of the path relationships between latent constructs.

Findings

The Bean and Metzner model (see Figure 1) was assessed using the path diagrams defining measurement models and the structural equation model outlined earlier. Although the Background and Defining Variable of ethnicity/race was of initial interest, the number of minority students completing the survey information was inadequate for meaningful analysis (whites = 597; minorities = 68). Therefore, the model was tested only on white students.

The adequacy of a proposed model can be judged on two criteria: first, the degree of explanation for a significant portion of the variance, and, second, how well the findings conform to the theorized causal model (Pascarella & Terenzini, 1991; Smart & Pascarella, 1987). Even after exploring the Bean and Metzner model several ways and restricting the elements in the analyses to the point of over-specifying the matrix parameters, the results from the structural equation modeling analysis showed that the Bean and Metzner model was an extremely weak fitting model for the empirical data of this study (Table 4). The goodness-of-fit indicator (GOF) and Adjusted

goodness-of-fit indicator (AGOF) measure the relative amount of variances and covariances of the actual model to the predicted model. The AGOF adjusts for the degrees of freedom of a model relative to the number of variables. A value of one indicates a perfect match of the actual and predicted variances and covariances. Since the results did not fall within the ranges for acceptable fit nor were the critical matrices "positive definite," the Bean and Metzner model was not accepted as explaining retention at the community college under study.

Table 4
Goodness-of-Fit Measures for the Bean and Metzner Model

	Desired Range	Analysis Results
χ^2/df ratio	≤ 2.00 to 3.00	5.890
GOF	**	.838
AGOF	**	.804
RMSR	≤ .05	.081
p	≥.05	0.000

** Desired values approach 1.00.

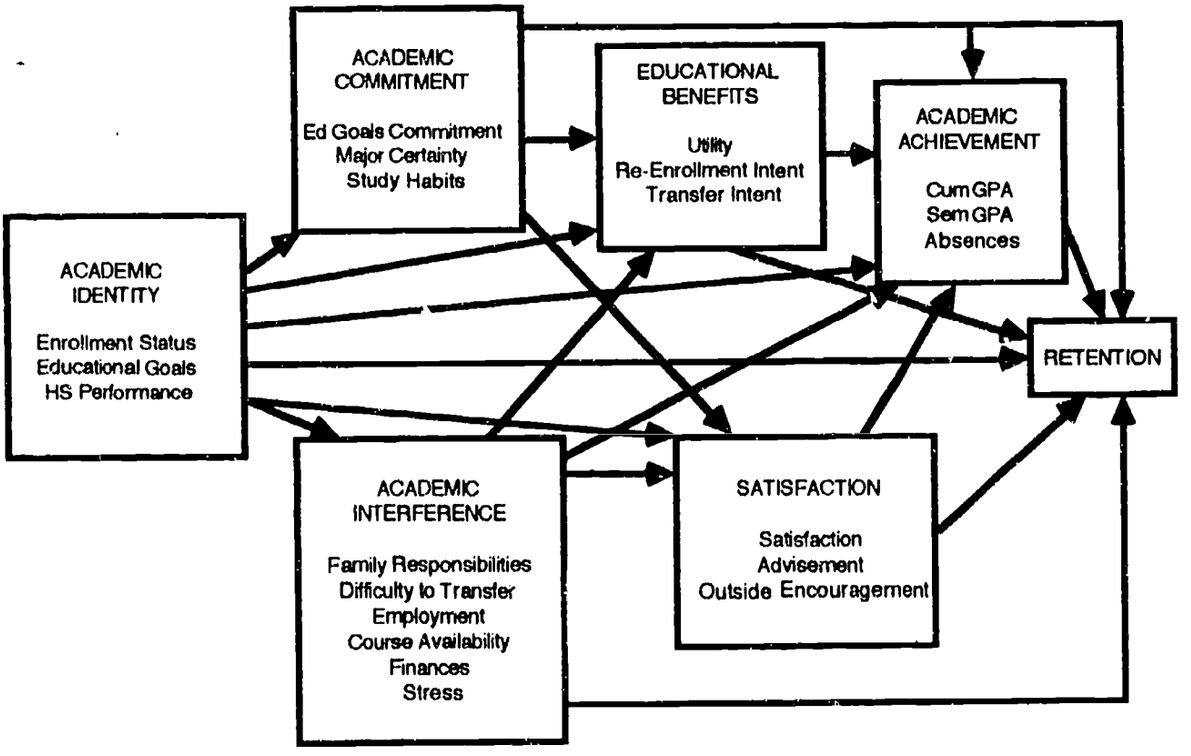
Development of the Community College Retention Model

The analysis then focused on making revisions to the model to better account for variance in the data. Exploratory factor analysis resulted in identification of new factors. This new model (Figure 5) was assessed using the same procedures as with the original Bean and Metzner model, which identified further modifications. Factor score coefficients obtained through factor analysis resulted in a new model with different latent variables (factors).

This new model retains many of the original variables introduced by Bean and Metzner, but the associations, or groupings, suggested by exploratory factor analysis, are different. Three Background and Defining Variables (age, ethnicity/race, and gender) were omitted from the Academic Identity section because they are attributes that cannot be changed by interaction with the college environment. One reason for this decision was the focus on variables that would help explain the dropout decision yet be of the type that colleges could adjust to increase retention. By removing the variables from the model, the effects of these defining variables are not compounded with the other variables measuring ksi.

The LISREL output suggested further changes to the model to improve the goodness-of-fit. Several measured variables loaded on more than one latent variable, and the paths between those variables and the constructs were "freed" and added to the model for estimation. An example of this added, or freed, path is Advisement. Although the factor analysis indicated that is was more closely correlated with the variables measuring Satisfaction, the LISREL analysis showed that Advisement was also closely related to the variables measuring Academic Commitment.

Figure 5. Conceptual model for retention of community college students



The LISREL analysis identified ten such relationships. These ten additional paths were incorporated because the modifications were conceptually sound and substantively improved the ratio of chi square with degrees of freedom (Bollen, 1989; Joreskog & Sorbom, 1988). All paths between measured and latent variables are displayed in Figure 6.

An assessment of the goodness-of-fit for the conceptual model for retention of community college students revealed that the overall measures were greatly improved. Table 5 displays the comparisons of the new goodness-of-fit measures with those in the desired target range and with the measures obtained from examination of the Bean and Metzner model. The goodness-of-fit

measures indicated that the Community College Retention model represents a plausible model of retention.

Once the overall goodness-of-fit measures for the Community College Retention model were found to be within the desired ranges, the individual components of the model were examined to determine the significance of the path coefficients of the observed variables to the latent variables.

Figure 6. Path diagram of measurement models
based on community college retention model

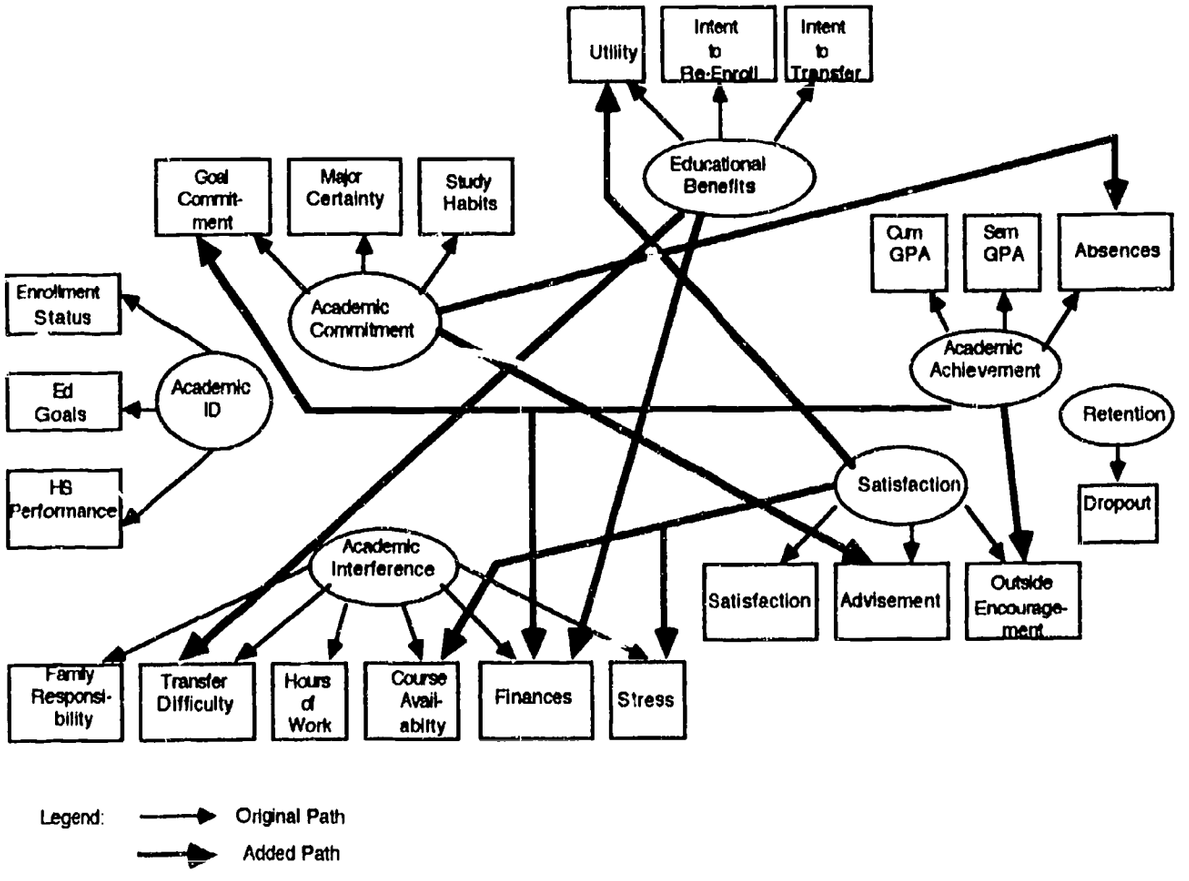


Table 5
Comparison of goodness-of-fit Measures

	Desired Range	Bean & Metzner Analysis	New Model Analysis
χ^2	----------	1563.74	441.66
df	----------	269.00	186.00
$\chi 2$/df ratio	≤ 3.00	5.81	2.37
GOF	**	0.838	0.934
AGOF	**	0.804	0.910
RMSR	≤ .05	0.081	0.056
p	≥ .05	0.000	0.000

** The desired values approach 1.00.

The Lambda X Matrix

The ξ (ksi) variable is an exogenous latent variable; that is, it is determined outside the model and acts only as a cause. In the Community College Retention Model, the ξ variable, Academic Identity, was estimated by three observed X-variables, Enrollment Status, Educational Goals, and High School Performance. Table 6 reports the Λ_x (Lambda X) matrix with the factor loading coefficients of the observed X-variables on the ξ variable. Factor loadings that were not significant are marked by asterisks. Significance is determined by a corresponding *t*-value greater than ± 1.96 which indicates that the value of the factor loading is statistically different from zero.

In specifying a model for analysis, some values are assigned a value of 1.00 to define the scale for the latent variable. When these initial values are set to 1.00, they are called "start values," and *t*-values can not be computed for the observed variables. In this matrix, a start value was set for High School Performance, and the *t*-value was not computed.

Table 6
Lambda X Coefficients Based on the Community College Retention Model

Academic Identity	
Enrollment Status	.143 *
Educational Goals	.185
High School Performance	.220

* Not significant

Discussion of Significance of X-Variables

The *t*-values indicated that Enrollment Status did not contribute significantly to the measurement of the ksi variable, Academic Identity. An assessment of the component fit measures also indicated an extremely low (0.9%) amount of variance (R^2) accounted for by Enrollment Status. The variable Educational Goals was significant. In addition to the *t*-value indicator, the variance of ksi accounted for by Educational Goals was 4.8%. Educational Goals had a very good fit with Retention, but the association was negative. It appeared that goals for more education were associated with non-retention at this community college. Although the *t*-value for High School Performance was not computed, other component fit measures (R^2 and fitted residuals) indicated a good fit.

It appeared that the overall model and measurement of ksi would be improved for this study with the omission of Enrollment Status. The other two variables, Educational Goals and High School Performance, appeared to be good measures of ksi. However, the total coefficient for determination estimated for all X variables on ksi was only 0.115, and 1.00 is the target value.

Lambda Y Matrix

The second matrix that reports the factor loadings of observed variables (Y) to the endogenous variables (η) is Λ_y (Lambda Y). The endogenous variables are latent variables explained by the model and can act as both cause and effect. Table 3 outlined the measurement of these variables. Table 7 reports the factor loading coefficients of the Lambda Y matrix elements.

Discussion of Significance of Y-Variables

The *t*-values indicated that all Y variables were significant in measuring the eta (η) variables. In addition, the R^2 estimate for all Y variables was 1.00, and the fitted residuals also indicated good fit. Overall, the Lambda Y measurement model represented a good fit between the measured and latent variables.

Each observed variable is significant when measuring the latent variable in addition to the paths added during the modifications. In each case, the coefficient for the added path is somewhat smaller than the coefficient for the original path except for Absences and Stress. For all the variables, except Absences and Stress, it appears that the clustering of variables identified through factor analysis is reaffirmed by the LISREL analysis.

Table 7
Lambda Y Coefficients Based on the Community College Retention Model

	Academic Commitment	Academic Interference	Educational Benefits	Satisfaction	Academic Achievement	Retention
Goal Commit	.371				-.127	
Major Certain	.414					
Study Habits	.446					
Family Resp.		.448				
Transfer Diff.		-.506	-.230			
Employment		.381				
Avail. Courses		.212		-.142		
Finances		.436	-.351		.134	
Stress		-.120		.230		
Utility			.667	.295		
Re-enr. Intent			.925			
Transfer Intent			.916			
Satisfaction				.500		
Advisement	-.229			.532		
Encourage.				.327	-.116	
Cum GPA					.657	
Sem GPA					.754	
Absences	.303				.106	
Dropout						.455

Gamma Matrix

The Gamma Matrix reports the standardized coefficients of the effects of the exogenous ksi variable on the endogenous eta variables and the corresponding *t*-values. In this study, the Gamma Matrix reports the coefficients estimated for ksi on the six eta variables: Academic Commitment, Academic Interference, Educational Benefits, Satisfaction, Academic Achievement, and Retention. The resulting path diagram of covariance coefficients of ksi to the eta variables is illustrated in Figure 7.

Discussion of the Gamma Matrix

The direct effects of the exogenous variable on all six endogenous variables were significant as indicated by the *t*-values. Further examination of the total and indirect effects of Academic Identity on the six eta variables found that the effects were high. The negative relationships of Academic Identity to Academic Interference, Educational Benefits, and Satisfaction should be noted. It would appear that students who did well in high school and who aspire to higher

educational goals experience less interference with their college commitments, do not feel it is so useful to remain at this college, and experience less satisfaction at this college and in their lives.

Figure 7. Path diagram of gamma effects within the community college retention model

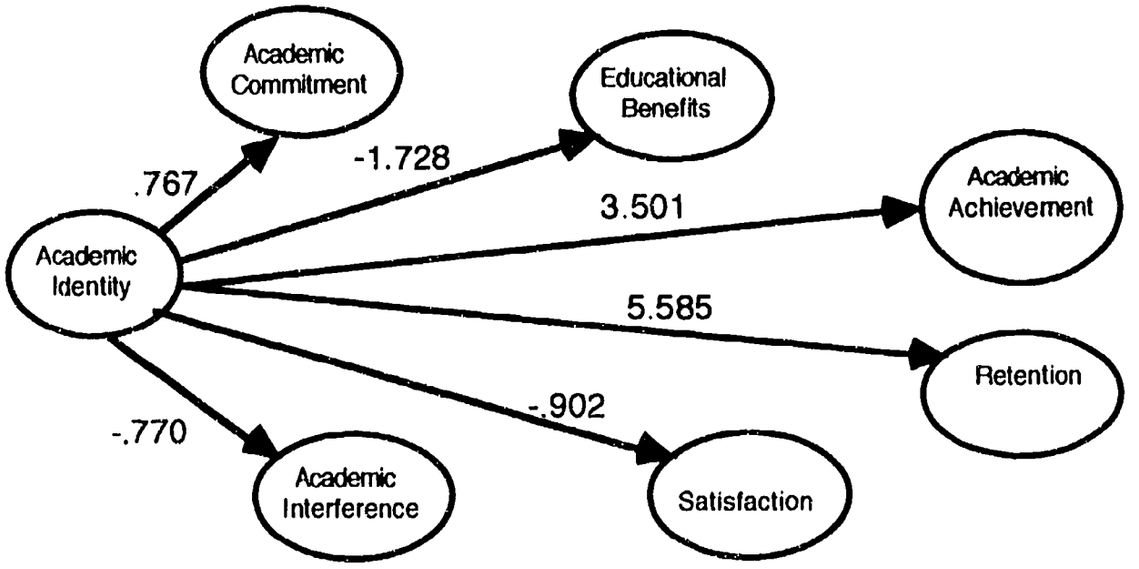


Table 8
Gamma Matrix Coefficients Based on the Community College Retention Model

	Academic Identity (ξ_1)
Academic Commitment (η_1)	.767
Academic Interference (η_2)	-.770
Educational Benefits (η_3)	-1.728
Satisfaction (η_4)	-.902
Academic Achievement (η_5)	3.501
Retention (η_6)	5.585

Beta Matrix

Table 9 reports the standardized coefficients that estimate the strength of the effects of the endogenous variables on each other.

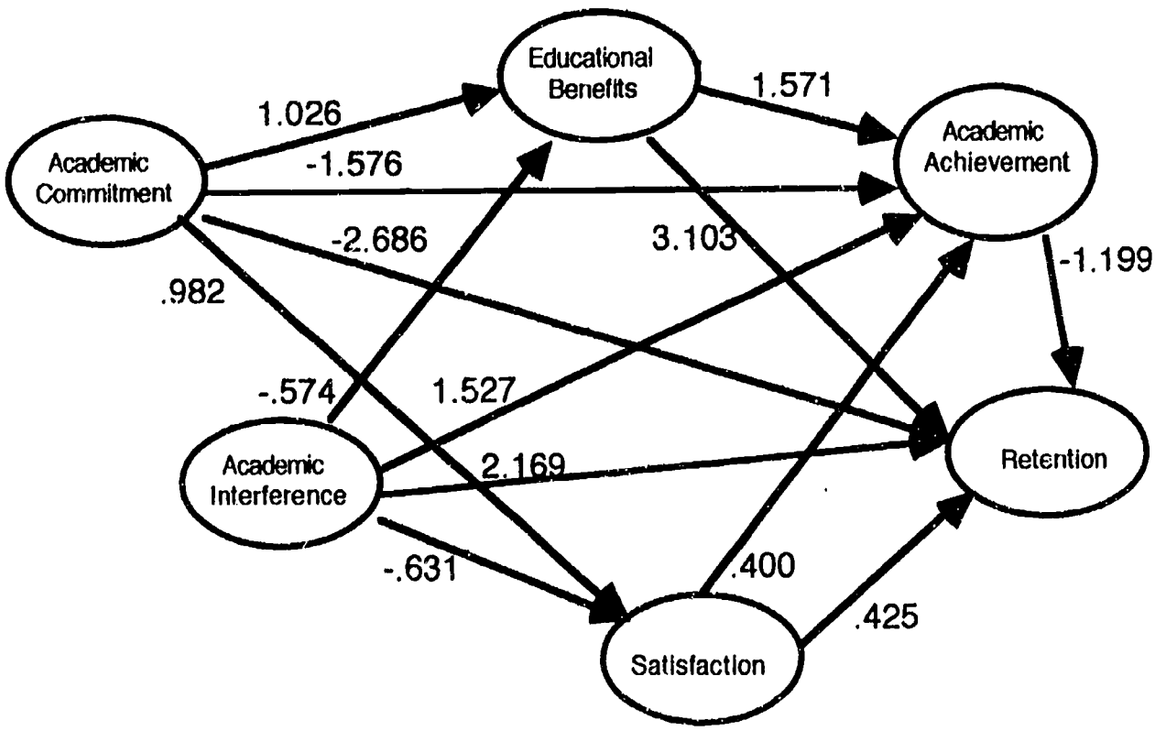
Table 9
Beta Coefficients Based on the Community College Retention Model

	Academic Commitment	Academic Interference	Educational Benefits	Satisfaction	Academic Achievement	Retention
Acad Commit						
Acad Interfer						
Ed Benefits	1.026	-.574				
Satisfaction	.982	-.631				
Acad Achieve	-1.576	1.527	1.571	.400		
Retention	-2.686	2.169	3.103	.425 *	-1.199	

* Not significant

These relationships are further illustrated in Figure 8 which is a path diagram of the relationships among the eta variables.

Figure 8. Path diagram of beta effects within the community college retention model



Discussion of the Beta Matrix

The path coefficients from Academic Commitment to four other eta variables were all significant; however, the negative relationships with Academic Achievement and Retention were surprising. They indicate that high scores for Academic Commitment were negatively associated

with high GPA's, low absences, and dropout. The positive relationships between Academic Interference and Academic Achievement and Retention indicated that high values of variables measuring Academic Interference were associated with high grade point averages, low absences, and high retention rates.

The effects of Educational Benefits on Academic Achievement and Retention were positive and significant. The direct effect of Satisfaction on Retention was not significant, nor were there large indirect effects through Academic Achievement. The large negative effect of Academic Achievement on Retention indicated that high GPA's and low absences have a negative relationship with Retention at this college.

Gender Comparisons

As a further test of the efficacy of the revised Community College Retention Model, separate analyses of structural equation modeling were initiated for the male students (N = 274) and the female students (N = 323) in the sample used to test the full model. The following table reports the findings for goodness-of-fit measures for the full Community College Retention Model and for the separate analyses for gender comparisons.

Table 10
Goodness-of-Fit Measures for Gender Comparisons

	Acceptable Range	Analysis Full Model	Analysis Females	Analysis Males
χ^2	----------	441.66	374.46	291.63
df	----------	186.00	186.00	186.00
χ^2/df ratio	≤ 3.00	2.37	2.01	1.57
GOF	**	.934	.900	.914
AGOF	**	.910	.864	.883
RMSR	≤ .05	.056	.072	.053
p	≥ .05	.000	.000	.000

** The desired values approach 1.00.

The overall goodness-of-fit measures indicated that the Community College Retention model remained plausible for explaining retention for both genders although it appeared to be stronger for male students.

Discussion and Conclusion

When the Bean and Metzner model proved not to have good fit with the data, a new model, the Community College Retention Model, was developed through exploratory factor analysis and was assessed for its explanatory strength through structural equation modeling. The LISREL analysis suggested modifications to the model and these were incorporated.

The first goal of developing the Community College Retention model was to explain the data of this study more accurately. The Community College Retention Model proved to a plausible model . The coefficient of determination (measure of variance accounted for) for the structural equations for the overall Community College Retention Model was 0.995. Since 1.00 is the goal, the model was accepted as having good fit with the data.

Table 10 compares the relationship of the original measurement variables and latent constructs in the Bean and Metzner model with the realignment of those variables in the Community College Retention Model.

Table 10

Comparison of Variables in the Bean & Metzner Model and Community College Retention Model

Bean and Metzner Model	Community College Retention Model
Background and Defining Variables	Academic Identity
Enrollment Status	Enrollment Status
Educational Goals	Educational Goals
HS Performance	HS Performance
Age	
Ethnicity	
Gender	
Residence	
Academic Variables	Academic Commitment
Study Habits	Study Habits
Major Certainty	Major Certainty
Academic Advising	Educational Goals Commitment
Absenteeism	
Course Availability	
Environmental Variables	Academic Interference
Finances	Finances
Hours of Employment	Employment
Family Responsibilities	Family Responsibilities
Opportunity to Transfer	Difficulty to Transfer
Outside Encouragement	Course Availability
	Stress

Academic Outcome	Academic Achievement
GPA	Cumulative GPA
	Semester GPA
	Absences
Psychological Outcomes	Satisfaction
Satisfaction	Satisfaction
Utility	Advisement
Goal Commitment	Outside Encouragement
Stress	
Intent to Leave	Educational Benefits
	Transfer Intent
	Re-Enrollment Intent
	Utility
Dropout	Retention

All the latent constructs and some of the measurement variables were renamed. The Bean and Metzner Background and Defining Variables of age, gender, ethnicity, and residence were omitted in the Community College Retention Model. The variables of age, gender, and ethnicity identify important student groups; in order for the model to be used effectively in studying retention patterns for these student subgroups, it is best not to co-mingle the effects of the demographic variables with the other variables in the model. Residence was not necessary because all students in this sample were commuter students and, thus, met the Bean and Metzner definition of nontraditional students. The Bean and Metzner variable of GPA was expanded to Cumulative GPA and Semester GPA.

The relationship of many measurement variables to latent constructs remained the same in both models: Enrollment Status, Educational Goals, High School Performance, Study Habits, Major Certainty, Finances, Hours of Employment, Family Responsibilities, Opportunity to Transfer, and Satisfaction. Other variables measured latent constructs different from the Bean and Metzner model: Academic Advisement, Absenteeism, Course Availability, Outside Encouragement, Utility, Goal Commitment, and Stress.

A second goal in developing a model that represents the data well is to assess the relative strength of the individual variables in the model in accounting for retention. Two of the three variables measuring the exogenous variable, Academic Identity, were found to be significant although they accounted for little of the variance.

Table 11
Variance Table for Lambda X Variables

Variable	Significant	Squared Multiple Correlations*
Educational Goals	yes	.048
High School Performance	yes	.066
Enrollment Status	no	.009

(Coefficient of Determination* for X Variables is .115)

* Desired values approach 1.00.

Goals for more education were associated with non-retention at this college. Prior studies have reported positive relationships of high Educational Goals to retention (Webb, 1988); however, they may not have reflected the retention patterns at a community college. To achieve goals of higher degrees, the students must leave the community college. The time chosen for transfer depends on many factors, such as finances, major, and difficulty to transfer. It is important that community colleges account for these transfers and not count them as dropouts. In fact, Okun, Ruehlman, & Karoly (1990) suggested that the term "institutional turnover" be used to describe more accurately the leaving pattern of many community college students who transfer to another college.

High School Performance was also negatively associated with retention although it has been proposed as the best predictor of college grades and/or persistence for traditional students in residential colleges (Astin, 1975; Bean and Metzner, 1985; Peng & Fetters, 1978). Prior research was conducted using traditional students as the sample. In this study, more than half of the students stated they were in the bottom half of their high school class. Since the community colleges are attracting these students with records of low academic performance, the colleges must address this problem as the student enrolls or the college will be a "cooling out" institution for many students.

Enrollment Status was found not to be significant in measuring Academic Identity. Earlier studies had found that a high number of credits was negatively associated with GPA because students work education into already crowded schedules. Also, younger students tend to attend full time and earn lower grades (Johnson & Wahlberg, 1988). The responses for this variable were heavily skewed toward full time students and probably accounts for this result which is

contrary to expectations from the literature. It is important that advisors and instructors cue students about time requirements so students can make informed choices about their ability to succeed in the class and meet their obligations at home, work, and in other classes.

All the Y variables were found to be significant for this study. Bean and Metzner had selected them to measure the endogenous variables because they were found to significant in previous retention studies. The relative contributions of each variable in measuring the latent constructs, as indicated by the squared multiple correlations, were varied. These indicators can provide assistance when searching for variables to eliminate in making the model more parsimonious or for variables to redefine in improving the model.

Table 12
Variance Table for Lambda Y Variables

Variable	Squared Multiple Correlations*
Cumulative Grade Point Average	.861
Semester Grade Point Average	.826
Satisfaction	.632
Intent to Transfer	.613
Utility	.599
Study Habits	.461
Intent to Re-Enroll	.330
Advisement	.302
Finances	.282
Transfer Difficulty	.264
Absences	.230
Goal Commitment	.210
Encouragement	.202
Stress	.193
Available Courses	.17[illegible]
Family Responsibility	.174
Major Certainty	.112
Employment	.072

(Coefficient of Determination* for Y Variables is 1.00.)

* Desired values approach 1.00.

The direct effects of the exogenous variable, Academic Identity, to the six endogenous variables were all significant (Figure 7). Pascarella, Duby, & Iverson (1983) found that the effects of background variables were equal to, if not more important than, college experiences on retention. The findings of this study also pointed out the importance of background on Retention

(5.585) and Academic Achievement (3.501). Not so strong was the direct effect on Academic Commitment (.767). However, the negative effects of Academic Identity on Educational Benefits (-1.728) and Satisfaction (-.902) were at first surprising.

Background variables associated with previous academic success were negatively associated with student perceptions of the benefits and satisfaction of remaining at the community college under study. These two negative associations again bring forth the issue of accounting for transfer students in retention studies of community college students. These findings raise questions about students who have past academic success and who seek higher degrees. Do they transfer, stopout, or dropout?

All but one of the direct effects (Satisfaction on Retention) of the endogenous variables on each other were significant (Figure 10). The paths from Academic Commitment to Educational Benefits (1.026) and to Satisfaction (.982) were positive and expected from the literature. The negative paths to Academic Achievement (-1.576) and to Retention (-2.686) were not expected. High goal commitment, certainty of major, and confidence in study habits have been linked with high GPA's and retention in other studies (Anderson, 1988; Pascarella, Duby, Miller, & Rasher, 1981, 1983; Webb, 1988; Williamson & Creamer, 1988). Because measurement paths were added as suggested by the the modification indices, the measurement of both constructs was affected by five additional paths which could have led to this negative relationship.

The negative relationship of Academic Commitment with Retention is not surprising when it is realized that students must leave the community college to attain higher degrees. That this occurred at the end of the first year is also not surprising because other studies have reported that dropout rate is highest at the end of the first year (Pascarella & Terenzini, 1979, 1983a; Tinto, 1987). The impact of this behavior is direct and expensive for the community colleges. Responding to so many new students each year puts a strain on college services, such as advisement and registration. Second year programming is limited and puts a hardship on students seeking sophomore level courses at times convenient to their working schedules. The morale of the faculty is also affected. Many desire to teach other than introductory courses and are disheartened by the exodus of students with high academic commitment.

The variables measuring Academic Interference have been studied often. Previous findings had been that family responsibilities would interfere with educational activities and lead to dropout.

Difficulty in transferring would retain the student at the college longer, employment would negatively affect persistence, and course at inconvenient times would lead to withdrawal (Bean and Metzner, 1985). Inadequate finances have been linked to withdrawal (Bean and Metzner, 1985; Cabrera et al., 1990; Okun et al., 1990; Webb, 1988). Multiple demands on student time lead to higher stress levels and withdrawal.

What was unexpected was that high indicators of Academic Interference were positively associated with Retention (2.169) and Academic Achievement (1.527). The findings from this analysis indicated that the external variables over which the college has no control did not exert the negative influences on performance and persistence as projected by Bean and Metzner (1985, 1987) and Tinto (1987, 1988). The students in this sample earned good grades and remained in college despite the traditional indicators of potential dropout. This might be because they are able to accommodate education into their routines; another consideration is the large number of younger students in this sample who are unmarried and without children. Their perception of family responsibilities is much different from single parents with young children.

The negative relationships of Academic Interference with Educational Benefits (-.574) and with Satisfaction (-.631) were expected. High indicators of Academic Interference were related to low indicators of usefulness to continuing and intent to re-enroll and to high intent to transfer. Indicators of high interference would also be associated with indicators of low overall satisfaction, low satisfaction with advisement, of little outside encouragement to continue.

Because these external variables are impossible for the institution to control, a benefit of identifying these relationships is to assist students during advisement. Predictive advisement can point out potential areas of trouble as well as identify college resources, such as child care, financial aid, early registration deadlines, and on-campus employment, to combat the indicators of Academic Interference.

The relationships between Educational Benefits and Academic Achievement (1.571) and Retention (3.103) were positive and strong. The variables used to measure Educational Benefits have been found to be significant predictors in many previous studies. Chickering (1974) found the practical value of continuing in college (utility) to be important to persistence. Okun et al. (1990) found Intent to Re-Enroll to be the best predictor of retention, and Bean (1987) found Intent to Transfer the best predictor of leaving the institution.

The power of these indicators can be tapped by the college at registration to assist in academic advising. Since student intent is so closely tied to retention, advisement can focus on specific short and long range plans. An important function that is often ignored during the rush of registration and advisement is followup tracking. Transfer students can be identified and tracked for their success at the receiving institution. This important indicator of community college success is often neglected but will become even more critical as the accrediting agencies demand plans for assessing institutional effectiveness and student success.

Satisfaction (satisfaction with life overall, satisfaction with quality of education, loyalty to the college, satisfaction with academic advisement, access to faculty outside of class, and outside encouragement) was positively associated with Academic Achievement (.400) and Retention (.425) although the relationship to Retention was not significant. These findings were supported by earlier studies. Okun et al. (1990) found that loyalty to the institution was not significant and that students viewed the college as a means rather than an end. Pascarella et al. (1983) determined that commitment to two-year institutions was based on academic integration. Others found that parental encouragement was important but there were no reported findings about spousal encouragement.

When the variables measuring Satisfaction in this study are examined, it is not surprising that this path was not significant. More than 50% of the students were neutral when asked about loyalty to the college although they expressed satisfaction with advisement and the quality of education they were receiving. Their outside support systems encouraged college attendance more strongly than they supported attendance at this particular college. This transitory view of the community college for an overwhelming number of students brings special problems. Okun et al. (1990) suggested that planning and intervention be aimed only at students who stated their intent to stay; yet 82% of the Okun sample reported their intent to stay, and only 62% did. Others would say that academic advising should be provided to all because it is often a key intervention that helps retain students (Carroll, 1988).

Community colleges can address this problem in several ways. One is to recognize the "passing through" nature of their students and continue to provide advisement services that take into account both short and long range plans. A second is to develop students services programs that build student loyalty and family encouragement for the college. Both can be expensive in terms of college human resources, but the first appears to be more practical in an urban setting

where "swirling students" are so prevalent (de los Santos & Wright, 1990).

The relationship of Academic Achievement to Retention was negative (-1.199). High grade point averages and low absences were related to higher withdrawal rates at this college. This would not have been predicted by reported studies of four-year institutions in which high grade point averages have been associated with persistence. The number of absences was not found to be an important indicator for students who did well academically but was an important predictor of withdrawal for other students (Bean, 1985; Pascarella et al., 1981). That this study found traditional indictors of persistence to be associated with withdrawal again points out the problem of community colleges in retaining students who perform well academically and who appear to be committed to academic success. Community colleges will continue to work with large numbers of new enrollees who view the college with a transitory and utilitarian perspective.

In conclusion, the Community College Retention Model is comprehensive with 22 measurement variables, not all significant or indicating reasonable influence. A refined, more parsimonious model may be developed by examining the measurement variables and selecting for each latent construct the two variables that account for the most variance.

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